United States
Department of
Agriculture

LOT SINGLE SAMPLING
PLAN - (ATTRIBUTES
STANDARDS ONLY)

Agricultural
Marketing
Service

Fruit and
Vegetable
Division

Processed
Products
Branch

GRADING MANUAL

File Code 120-A-7

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This manual is designed for Processed Products Branch personnel of the U.S. Department of Agriculture. Its purpose is to give background information and guidelines to assist in the uniform application and interpretation of U.S. grade standards, other similar specifications, and special procedures.

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This manual is for sale to the public. Address inquiries to:

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I N D E X

WHEN TO USE THE LOT SINGLE SAMPLING PLAN (ATTRIBUTES).

Use the lot single sampling plan (attributes) when the purpose is to:

1.   Accept or reject a lot stored in a public warehouse, freezer storage, plant warehouse, truck or rail car, or other similar storage;

2.   Accept or reject the entire production from a basic grading period as one lot. You may draw the sample units from either the production line or the warehouse;

3.   Perform an appeal inspection (attributes only); or

4.   Grade an unofficial sample.

NOTE: You may not use the lot plan to accept or reject portions of a lot (e.g., codes, pallets, etc.), unless you sample each portion and treat it as a lot.

HOW TO DRAW THE SAMPLE.

1.   Follow the general procedures and instructions as outlined in
        File Codes 120-A-1 and Inspection Aid No. 42 (maximum lot size is limited).
        Draw the number of sample units as indicated by these procedures, except, as
        outlined below.

2.   The minimum sample size is the entire contents of 6 containers. The
        maximum sample size is the entire contents of 29 containers. The sample sizes are
        as follows:

CONTAINER SIZE	MINIMUM SAMPLE SIZE
	NO. OF SAMPLE UNITS
INSTITUTIONAL (e.g., No. 10, gallon, 2-1/2, lb. carton, etc.)	(---entire contents---) 3 6 13 21 29 1/
CONSUMER (e.g., No. 300, No. 303, 2-1/2, 10 oz, 20 oz, etc.)	(---entire contents---) 6 13 21 29 1/
BULK (e.g., tote bins, 30 lb. etc.)	(------subs------) 6 13 21 29 1/

1/   The minimum sample size that can be inspected is 36 units of product.

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HOW TO EVALUATE A SAMPLE.

1. Nonquality factors. Make all nonquality factor determinations that are required for the product. Make these decisions on a container-by-container basis.

    Example 1: (Tally sheet showing only nonquality factors)

Container Code	ABC	---	KLM	---	NOP	RST
Net Weight (Grams)	455	454	452	456	455	454
Vacuum	3	4	3	3	4	4
Drained Weight (grams)	297	283	289	269	297	286
Sirup (degrees Brix)	20	20	21	21	19	20
Designation	Heavy	---	---	---	---	---
Style	Halves	---	---	---	---	---
Count	7	6	6	7	5	7

2. Quality factors.

    a. Prerequisite quality factors. Evaluate and record each prerequisite quality factor which is applicable for the product. Make these decisions on a container-by-container basis. Record the prerequisite grades as either grade A, grade B, grade C, or Substandard.

    Example 2: (Tally sheet showing only prerequisites)

	Brightness	A	A	A	A	A	B
P	Flavor and Odor	A	A	A	A	A	A
E	Peel	A	A	B	A	A	A
R	Uniformity of Size	A	A	A	A	A	A

HOW TO EVALUATE A SAMPLE (continuation).

2. Classified defects. After the nonquality factors and prerequisite quality factors have been evaluated and recorded, the individual containers lose their identity for the purpose of classifying defects. Use the entire contents of all of the containers in the sample.

    i. Starting with the first container, arrange all of the product in a straight line (or lines). Go to the second container and add those units of product to the end of the line where the first container stopped. Do the same for all additional containers in the sample, until all of the units of product are arranged in order.

Example 3: (Arranging the sample)
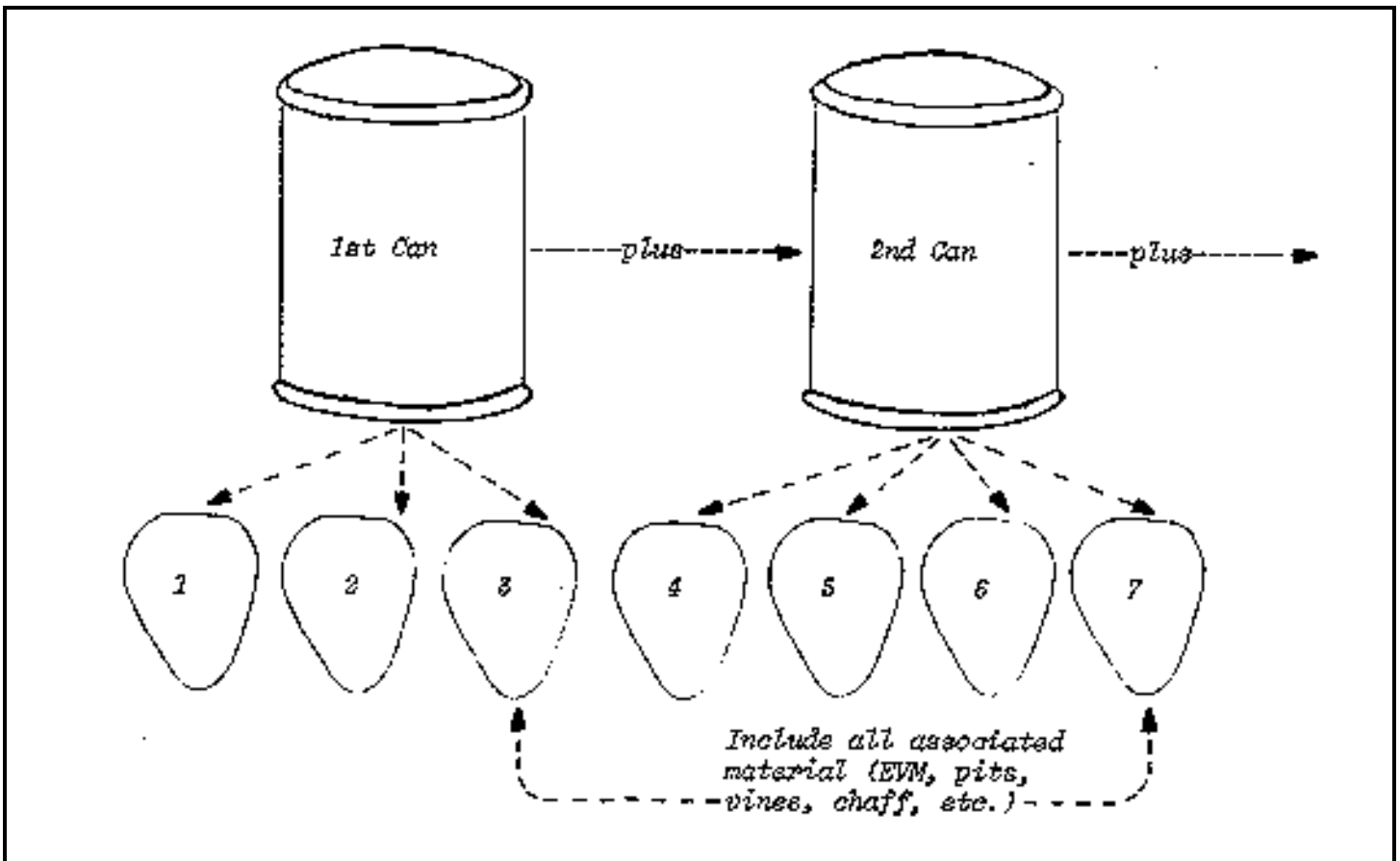
HOW TO EVALUATE A SAMPLE (continuation).

2. Quality factors (continuation).

    b. Classified defects (continuation).

        ii. Count the total number of units of product (follow each separate U.S. standard to determine whether broken units are to be reassembled; and whether associated material is to be included in the count) in the sample.

Example 4: (Showing the total sample).

HOW TO EVALUATE A SAMPLE (continuation).

    2.   Quality factors (continuation).

        b.   Classified defects (continuation).

            iii.   Adjust the total number of units of product in the sample to correspond with the sampling plan.

Example 5: (Adjusting the sample to the sampling plan)

TABLE XV
LOT SINGLE SAMPLING PLANS

STANDARD SAMPLE UNIT SIZE = 6

HOW TO EVALUATE A SAMPLE (continuation).

    2.   Quality factors (continuation).

        b.   Classified defects (continuation).

           iv.   Follow the U.S. standards or other specifications to classify the defects in the sample.

Example 6: (Table showing classification of defects)

TABLE _____

CLASSIFICATION OF DEFECTS

Quality Factor	Defect	Classification			
		Min	Maj	Sev	Crit
Harmless Extraneous Vegetable Material	Tender (each piece) Coarse (each piece)			X	X
Tough Fiber	Nonwoody (each 5 g) Woody (each 5 g)		X	X	
Blemished	Slightly (each 5 g) Materially (each 5 g) Seriously (each 5 g)	X	X	X	

or

"_____ Foods, Inc., Specification for _____

Defects shall be classified as specified in the applicable U.S. Standards for Grades
of _____, except:

    Harmless Extraneous Material - ALL HEM shall be classified as critical defects."

9
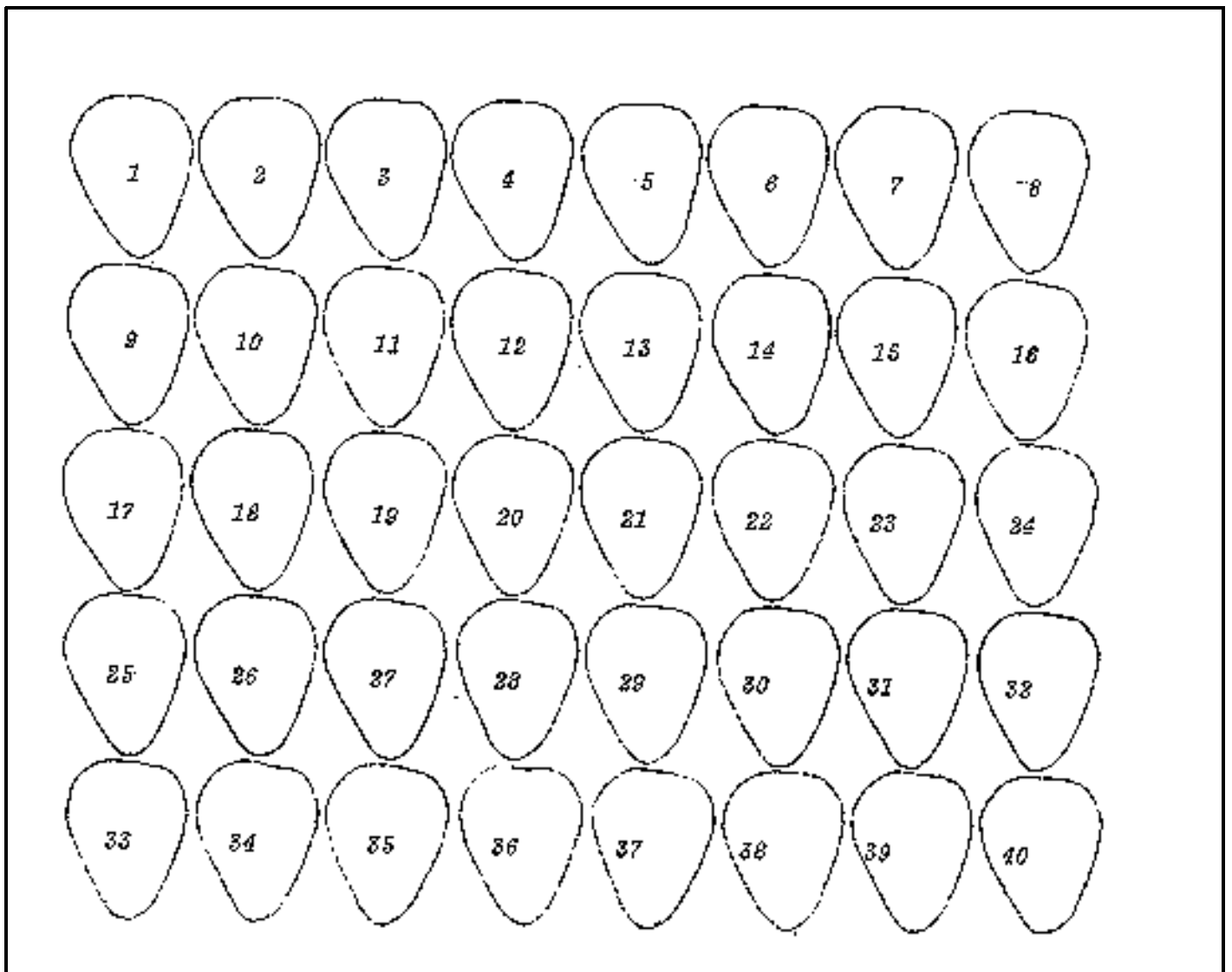
HOW TO EVALUATE A SAMPLE (continuation).

2. Quality factors (continuation).

      b. Classified defects (continuation).

            v. To classify the defects, start with the worst defects first (this will help avoid reclassifying related defects, if any). Put all of the critical defects from the entire sample in a grading tray. Refer to this as the critical tray.

Example 7: (Showing only critical defects)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	35	36					
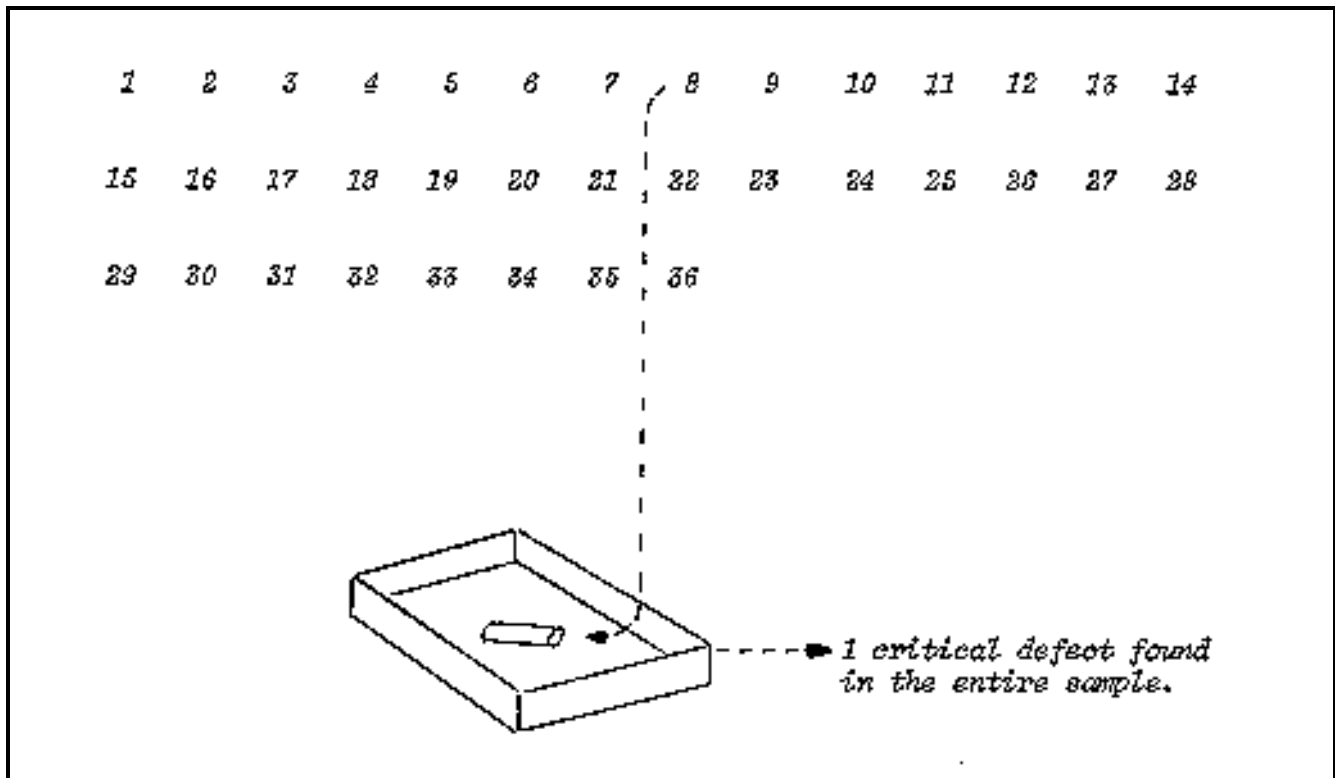
The U.S. standards may mention the reassembly of specific defects. In this situations, only the reassembled unit of product is counted as 1 defect. See each individual U.S. Standard, or grading manual, to determine if this provision is made for the defect in question.

HOW TO EVALUATE A SAMPLE (continuation).

2. Quality factors (continuation).

    b. Classified defects (continuation).

        vi. Record the count of critical defects on the defect tally in the appropriate boxes.

Example 8: (Showing tally of critical defects)

Container Code	ABC	---	KLM	---	NOP	RST			
Net Weight (Grams)	455	454	452	456	455	454			
Vacuum	3	4	3	3	4	4			
Drained Weight (grams)	297	283	289	269	297	286			
Sirup (degrees Brix)	20	20	21	21	19	20			
Designation	Heavy	---	---	---	---	---			
Style	Halves	---	---	---	---	---			
Count	7	6	6	7	5	7			

P E R	Brightness	A	A	A	A	A	B		
	Flavor and Odor	A	A	A	A	A	A		
	Peel	A	A	B	A	A	A		
	Uniformity of Size	A	A	A	A	A	A		

		S	T	L							
C R I T	HEM										1
	Total Critical									1	

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HOW TO EVALUATE A SAMPLE (continuation).

    2.   Quality factors (continuation).

        b.   Classified defects (continuation).

            vii.   Follow the sample procedure as outlined in example 7, except, classify the severe defects. Include any unrelated defects in the critical tray that may also be severe defects. Record the count of severe defects in the appropriate boxes.

Example 9: (Showing tally of severe defects)

Container Code	ABC	---	KLM	---	NOP	RST				
Net Weight (Grams)	455	454	452	456	455	454				
Vacuum	3	4	3	3	4	4				
Drained Weight (grams)	297	283	289	269	297	286				
Sirup (degrees Brix)	20	20	21	21	19	20				
Designation	Heavy	---	---	---	---	---				
Style	Halves	---	---	---	---	---				
Count	7	6	6	7	5	7				

P E R	Brightness	A	A	A	A	A	B				
	Flavor and Odor	A	A	A	A	A	A				
	Peel	A	A	B	A	A	A				
	Uniformity of Size	A	A	A	A	A	A				

C R I T		S	T	L							1		
	HEM										1		
	Total Critical											1	

S E V E R E	HEM										1		
	Woody Fiber										1		
	Total Severe											2	

HOW TO EVALUATE A SAMPLE (continuation).

2. Quality factors (continuation).

  b. Classified defects (continuation).

   viii. Follow the same procedure as outlined in example 7, except, classify the major defects. Include in the count of major defects, any unrelated defects in the critical or severe trays that may also be major defects. Record the count of major defects in the appropriate boxes.

Example 10: (Showing tally of major defects)

Container Code	ABC	---	KLM	---	NOP	RST			
Net Weight (Grams)	455	454	452	456	455	454			
Vacuum	3	4	3	3	4	4			
Drained Weight (grams)	297	283	289	269	297	286			
Sirup (degrees Brix)	20	20	21	21	19	20			
Designation	Heavy	---	---	---	---	---			
Style	Halves	---	---	---	---	---			
Count	7	6	6	7	5	7			

P E R										
	Brightness	A	A	A	A	A	B			
	Flavor and Odor	A	A	A	A	A	A			
	Peel	A	A	B	A	A	A			
	Uniformity of Size	A	A	A	A	A	A			

C R I T		S	T	L							
	HEM									1	
	Total Critical										1

S E V E R E											
	HEM									1	
	Woody Fiber									1	
	Total Severe										2

M A J O R											
	Blemished									2	
	Nonwoody Fiber									1	
	Total Major										3

HOW TO EVALUATE A SAMPLE (continuation).

2.   Quality factors (continuation).

b.   Classified defects (continuation).

ix.   Follow the same procedure outlined in example 7, except, classify the minor defects. Include in the count of minor defects, any unrelated defects in the critical, severe, or major trays that are also minor defects. Record the count of minor defects in the appropriate boxes.

Example 11: (Showing tally of minor defects)

P E R	Brightness	A	A	A	A	A	B			
	Flavor and Odor	A	A	A	A	A	A			
	Peel	A	A	B	A	A	A			
	Uniformity of Size	A	A	A	A	A	A			

C R I T		S	T	L									
	HEM										1		
	Total Critical											1	

S E V E R E	HEM										1		
	Woody Fiber										1		
	Total Severe											2	

M A J O R	Blemished										2		
	Nonwoody Fiber										1		
	Total Major											3	

M I N O R	Damaged										2		
	Blemished										2		
	Total Minor											4	

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HOW TO EVALUATE A SAMPLE (continuation).

    2.   Quality factors (continuation).

        b.   Classified defects (continuation).

           x.   Total all of the defects found in the sample. Include in the count of total defects, all critical, severe, major, and minor defects. Record the count of total defects in the appropriate boxers.

Example 12: (Showing tally of total all classes of defects)

PER	Brightness	A	A	A	A	A	B			
	Flavor and Odor	A	A	A	A	A	A			
	Peel	A	A	B	A	A	A			
	Uniformity of Size	A	A	A	A	A	A			

CRIT		S	T	L									
	HEM										1		
	Total Critical											1	

SEVERE	HEM								1		
	Woody Fiber								1		
	Total Severe									2	

MAJOR	Blemished								2		
	Nonwoody Fiber								1		
	Total Major									3	

MINOR	Damaged								2		
	Blemished								2		
	Total Minor									4	

Total All Classes										10 *	10 *	

                                                    * Double check

HOW TO EVALUATE A SAMPLE (continuation).

2.   Quality factors (continuation).

c.   Other defects, if any. Some U.S. standards or special procedures may
        have defects that are not classified as minor, major, severe, or critical.
        However, follow the general procedures in this manual to tally the
number of nonconforming units of product found in the sample.

Example 13: (Other defects)

G	Substandard Units										2	
R	CUSUM	0.4	0.8	0.8								
A	Grade "C" Units										5	
D	CUSUM	1	1.8	2.6								
E	Grade "B" Units										10	
	Total "B" "C" "SSTD"										17	
"A"	CUSUM	2	15	6								

HOW TO EVALUATE A SAMPLE (continuation).

  2.   Quality factors (continuation).

          c.   Other defects, if any (continuation).

      Example 14: (Other defects)

MOUNT COUNT RECORD

Date	Lot No.	Products Canned Tomatoes											
Inspector		AQL= 8.5					Acceptance Level 12 %						
Sample No. or Code	Record by Fields					ACC.	REJ.	Sample No. or Code	Record by Fields		ACC.	REJ.	
	-	-	-	-	-								
	-	+	-	-	-								
	-	-	-	-	+								
	-	-	+	-	-								
	-	-	-	-	-								
	-	-	-	-	-								
	+	-	+	-	-								
	-	-	-	-	-								
	-	-	-	+	-								
6/50	-	-	-	-	-								

HOW TO ASSIGN A GRADE TO A SAMPLE.

    1.   Prerequisite quality factors. All prerequisite quality factors must meet the requirements of the grade that is assigned.

Example 15: (Showing prerequisite quality factors)

P E R	Brightness	A	A	A	B	A	A			
	Flavor and Odor	A	A	A	A	A	A			
	Peel	A	A	A	A	A	A			
	Uniformity of Size	A	A	A	A	A	A			

		S	T	L									

Sample Unit Grade		A	A	A	B	A	A			

Final Grade		Could	grade	no	higher	than	grade	B		

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HOW TO ASSIGN A GRADE TO A SAMPLE (continuation).

1.   Prerequisite quality factors (continuation).

Example 16: (Showing prerequisite quality factors)

P E R	Brightness	A	A	A	A	A	A			
	Flavor and Odor	A	A	A	A	A	A			
	Peel	A	A	A	A	A	C			
	Uniformity of Size	A	A	A	A	A	A			

		S	T	L										

| Sample Unit Grade | | A | A | A | B | A | C | | | | |

| Final Grade | | Could | grade | no | higher | than | grade | C | | | |

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HOW TO ASSIGN A GRADE TO A SAMPLE (continuation).

2. Classified quality factors. The defects in the sample shall not exceed the acceptance numbers for "total all classes," "major," "severe," and "critical" classifications.

      a. Refer to the appropriate product standards (or other specifications) to obtain the published AQLs for each grade level.

Example 17: (Showing AQLs for each grade level)

	GRADE A				GRADE B				GRADE C			
	Total 1/	Maj	Sev	Crit	Total 1/	Maj	Sev	Crit	Total 1/	Maj	Sev	Crit
AQL 2/	12.5	4.0	1.5	1.0	20.0	6.5	4.0	1.5	25.0	10.0	6.5	2.5

1/ Total = Minor + Major + Severe + Critical.
2/ AQL expressed as defects per 100 units.

or

"_____ Foods, Inc., Product Specification for

Frozen _____ or canned _____, Second Label:

	Total 1/	Maj	Sev	Crit
AQL 2/	15.0	5.0	2.5	1.0

1/ Total = Minor + Major + Severe + Critical.
2/ AQL expressed as defects per 100 units.

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HOW TO ASSIGN A GRADE TO A SAMPLE (continuation).

2.   Classified quality factors (continuation).

   b.   Match the AQLs in the U.S. standards (or other specifications) with the
           lot single sampling plan that you're using.

Example 18: (Showing lot single sampling plan)

TABLE XV
LOT SINGLE SAMPLING PLANS

STANDARD SAMPLE UNIT SIZE = 6 *

NUMBER OF SAMPLE UNITS 6 * 13 21 29				
ACCEPTANCE NUMBERS QUALITY LEVELS EXPRESSED AS DEFECTS PER HUNDRED UNIT OR PERCENT DEFECTIVE				
AQL				
Crit	1.0	1	2	3	4
Sev	1.5 2.5	1 3	3 4	4 6	5 8
Maj	4.0 5.0	4 4	6 7	9 11	11 14
Total	12.5	8	15	22	29

* 36 units of product examined *

HOW TO ASSIGN A GRADE TO A SAMPLE (continuation).

    2.   Classified quality factors (continuation).

          c.   Compare the acceptance numbers from the lot single sampling plan that you're working with to the number of defects that you've found in the sample.

Example 19: (Showing defect tally and acceptance numbers).

Container Size		24/303		B/B	E/L						
P R E	Brightness	A	A	A	A	A	A				
	Flavor and Odor	A	A	A	A	A	A				
	Peel	A	A	A	A	A	A				
	Uniformity of Size	A	A	A	A	A	A				
AQL C R I T 1.0		S	T	L					Ac. No. =		
	HEM									1	
	Total Critical										1 = 1
S E V E R E 1.5	Short Stem									1	
	Fibrous										
	Total Severe										1 = 1
M A J O R 4.0	Gouged									2	
	Blemished									1	
	Total Major										3 = 4
M I N O R	Damaged									1	
	Blemished									1	
	Total Minor										2
Total All Classes 12.5										7	7 = 8
Sample Unit Grade		A	A	A	A	A	A				
Final Grade											A

HOW TO ASSIGN A GRADE TO A SAMPLE (continuation).

    2.   Classified quality factors (continuation).

        c.   Defects cannot exceed acceptance numbers (continuation).

Example 20: (Mold count record)

MOUNT COUNT RECORD

Date	Lot No.	Products Tomato Juice											
Inspector AQL= 15.0							Acceptance Level 20 %						
Sample No. or Code	Record by Fields					ACC.	REJ.	Sample No. or Code	Record by Fields			ACC.	REJ.
	-	+	-	-	-								
	-	-	-	+	-								
	-	-	+	-	+								
	+	-	-	-	-								
	-	-	-	-	-								
	-	-	-	-	-								
	-	-	+	-	-							Ac. No.	
	-	-	-	-	+								
	-	+	-	-	-								
	-	-	-	+	-								
	-	-	-	-	-								
	-	-	+	-	+								
	-	+	-	-	-							16	
	-	-	-	-	-							75 Fields	
12 75 Fields	-	-	-	+	-	X							

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APPENDIX.

   1.   Relationship of the container size to the appropriate sampling plan to use for
           inspection.

           Use the entire contents of all of the containers in the sample (except tote bins,
           30 lb cans. etc.) to attain the largest sample possible. If small containers, such
           as 8 ounce cans, with fewer than 6 units in each can (or when a larger sample
           is desired) are being sampled, draw multi-containers. The total number of units
           of product that may be inspected for each sampling plan is as follows:

   Example 21:

NUMBER OF SAMPLE UNITS

	6	13	21	29
Units of Product				
"Regulations Table XV (6)	36	78	126	174
Table XVI (13)	78	169	273	377
Table XVII (25)	150	325	525	725
Table XVIII (50)	300	650	1050	1450
Table XIX (100)	600	1300	2100	2900

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APPENDIX.

   1.   Relationship of the container size to the appropriate sampling plan to use for
           inspection (continuation).

           Select the sampling plan based on the average number of units of product in
           each container (e.g., 6 peach halves, 50 broccoli spears or 100 green beans).

Example 22:

6 No. 303 Cans
1st = 6 Units
2nd = 7 "
3rd = 5 "
4th = 6 "   -- Use Table XV (6) of the "Regulations"
5th = 8 "
6th = 74 " (minus 3)

   36 "

Example 23:

13 No. 2-1/2 Cans

1st = 15 Units
2nd = 18 "
3rd = 12 "
4th = 13 "
5th = 14 "
6th = 15 "
7th = 13 "   Use Table XVI (13) of the "Regulations"
8th = 12 "
9th = 15 "
10th = 14 "
11th = 13 "
12th = 12 "
13th = 143 " (minus 11)

   169 "

APPENDIX.

1.   Relationship of the container size to the appropriate sampling plan to use for
        inspection (continuation).

Example 24:

6/20-ounce Cartons
1st = 48 Units
2nd = 55 "
3rd = 50 "
4th = 52 "
5th = 49 "
6th = 50 "
7th = 47 "   Use Table XVIII (50) of the "Regulations"
8th = 48 "
9th = 50 "
10th = 51 "
11th = 52 "
12th = 50 "
13th = 5048 " (minus 2)

      650 "

Example 25:
1st = 96 Units
2nd = 100 "
3rd = 110 "
4th = 98 "
5th = 105 "
6th = 102 "
7th = 98 "
8th = 101 "
9th = 105 "
10th = 100 "   Use Table XIX (100) of the "Regulations"
11th = 99 "
12th = 100 "
13th = 110 "
14th = 102 "
15th = 103 "
16th = 106 "
17th = 104 "
18th = 98 "
20th = 99 "
21st = 10264" (minus 38)

      2100 "

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APPENDIX.

2.   Associated material (harmless extraneous vegetable material, pits, seeds, chaff, broken, pieces, etc.).

The U.S. standards specify when associated material is to be included (or

reassembled and included) in the standard sample unit size. Usually the standards require that associated material be included in the standard sample unit size if 50 percent or more of the contents of the last container in the sample unit is used for inspection. Under lot inspection, all of the contents of the containers in the sample are used for inspection, except, possibly the last container. The rule in the standards, 50 percent or more, still applies under the lot plan. However, it would apply only to the last container in the sample.

Example 26: (Refer to example 22, page 25.)

All of the associated material in each can would be included in the sample.

Example 27: (Refer to example 23, page 25.)

All of the associated material in the first 12 cans would be included in the sample. None of the associated material in the 13th can would be included. Less than 50 percent of can 13 was included in the sample.

Example 28: (Refer to example 24, page 26.)

All of the associated material in each carton would be included in the sample.

Example 29: (Refer to example 25, page 26.)

All of the associated material in each can would be included in the sample.

APPENDIX.

3.   Inspection of No. 10 cans, gallons (glass), or similar containers.

Although 6 sample units is the minimum sample size for the lot single

sampling plan (attributes), it is permissible to draw only 3 containers from small lots of large containers, when 3 is the sample size indicated by Inspection Aid No. 42.

Use all of the units of product possible and apply them to the acceptance numbers that would work best for the total number of units of product in the sample. IMPORTANT: 36 units of product (6 x 6 = 36) is the least number that could be inspected. If 3 cans fall short of 36 units of product, draw additional cans.

Example 30:

<u>3 No. 10 Cans</u>
1st = 36 Units
2nd = 35 "   Use Table XVI (13) of the "Regulations"
3rd = <u>307</u> " (minus 23)

   78 "

Eliminate the last 23 units in the last can and use 78 units (13x6=78) for inspection.

Example 31:

<u>3 No. 10 Cans</u>
1st = 60 Units
2nd = 55 "   Use Table XVII (25) of the "Regulations"
3rd = <u>4835</u>" (minus 13)

   150"

Eliminate the last 13 units in the last can and use 150 units (25x6=150) for inspection.

APPENDIX.

3.   Inspection of No. 10 cans, gallons (glass), or similar containers (continuation).

Example 32:

<u>3 No. 10 Cans</u>
1st =   96 Units
2nd = 100   "   Use Table XVIII (50) of the "Regulations"
3rd = <u>102</u>   "

   298   "

The 2 units short of 300 (50x6=300) is within insignificant plus or minus variation.

4.   Standard sample unit size or number of defects, by weight, rather than by count.

     a.   Standard sample unit size. Some U.S. standards specify the standard sample unit size, by weight, (e.g., 250 g). In these situations, follow the same procedure outlined in this manual, except, convert to weight.

Example 33: (Each 5 g equals 1 defect)

<u>6/10-ounce Cartons</u>
1st = 284 g
2nd = 285   "
3rd = 284   "
4th = 285   "   Use Table XVII (25) of the "Regulations"
5th = 286   "
6th = <u>202</u>   " (minus 83 g)

   1625   "

$$\frac{1625}{5} = 325$$

APPENDIX.

4.   Standard sample unit size or number of defects, by weight, rather than by count (continuation).

     a.   Standard sample unit size (continuation).

Example 34: (Each 5 g equals 1 defect)

<u>6 No. 10 Cans</u>
1st = 1985 g (drained wt)
2nd = 2000 "
3rd = 1993 "
4th = 1996 "   Use Table XIX (100) of the "Regulations"
5th = 1990 "
6th = <u>536</u> " (minus 1452 g)

        10500 "

$$\frac{10500}{5} = 2100$$

b.   Number of defects. Some U.S. standards specify that 1 defect equals "x" amount. In these situations, follow the same procedure outlined in this manual, except, convert to weight.

Example 35: (Each 5 g equals 1 defect)

S E V E R E	Blemished (Seriously)				
	Fiber (Woody)				13 *
	HEM (Class 1)				
	TOTAL SEVERE				
	CUSUM	Grade A	0.4	0.8	1.6
		Grade B	1	1	2
M A J O R	Blemished (Materially)				
	Fiber (Nonwoody)				26 **
	TOTAL MAJOR				
	CUSUM	Grade A	1.5	1.5	3
		Grade B	1	3	3

Woody fiber = $\frac{62}{5}$ g *

Nonwoody fiber = $\frac{128}{5}$ g **

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APPENDIX.

5.   Lot segregation.

Under the lot single sampling plan, it is not possible to segregate portions of a

failed lot. If the applicant wishes to identify possible portions (codes or subcodes) that are much worse than the average quality level of the lot, those portions must be sampled as a separate lot.

It is possible, however, to make notes on the defect tally sheet which would indicate that specific codes in the sample were much worse than others. This information would be useful to an applicant who wished to rework a failed lot. Unless the offending codes are much worse than the average quality level of the lot, the apparent poorer quality of some containers could be assignable to sampling variation. Also, sampling variation could cause a strictly "borderline" lot to fail one time and pass the next, or vice versa.

6. Adjusting the defect tally.

In some situations, it is necessary to adjust specific defects on the tally prior to determining acceptance for lower grades. If a sample fails grade A, remove those defects that are offending to grade A only, and determine acceptance for grade B. If a sample fails grade B, remove those defects that are offending to grade B only, and determine acceptance for grade C.

Example 36: (Defects that would need adjusting)

Table_____

CLASSIFICATION OF DEFECTS

Quality Factor	Defect	Classification			
		Min	Maj	Sev	Crit
Individual Unit Color	Reasonably well developed (in grade A only)	X			
	Poorly developed (in grades A & B)		X		

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APPENDIX.

6. Adjusting the defect tally (continuation).

Example 37: (Sample failed grade A, adjusted for grade B)

Container Size	9 oz carton w/printed overwrap

P R E	Brightness	A	A	A	A	A	A				
	Similar Varieties	A	A	A	A	A	A				
	Flavor and Odor	A	A	A	A	A	A				
	Sloughing	A	A	A	A	A	A				
C R I T		S	T	L							
	EVM									2	
	Total Critical										2
S E V E R E	Fiber									2	
	Unstemmed									2	
	Total Severe										4
M A J O R	Blemished									7	
	Devel. (Fairly)									7	
	Total Major										14
M I N O R	Blemished									12	
	Devel. (Reason)									12	
	Total Minor										24
Total All Classes										44	
Sample Unit Grade		A	A	A	A	A	A				
Final Grade										B	

Acceptance A: CRIT=3, SEVERE=5, MAJOR=14, TOTAL ALL CLASSES=39.
Acceptance B: CRIT=4, SEVERE=10, MAJOR=21, TOTAL ALL CLASSES=63.

Also notice in example 37, that it would not be necessary to adjust the defect tally to accept the sample -- all classifications of defects are less than the acceptance numbers for grade B. However, the tally was adjusted to illustrate the procedure.

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APPENDIX.

7.   Special procedure for unofficial samples.

Branch "Regulations" provide for inspection of samples submitted by the applicant. These samples are unofficial and do not represent any lot. If the

applicable standards (or specifications) for the product are by AQL, use the following procedure:

a. Single containers with fewer units of product than 1 standard sample unit size (1 sample unit) cannot be inspected.

   Example 38: (1 standard sample unit)

   "Whole style -- 100 units"
   "Sliced lengthwise style - 250 g"

b. Multiple containers with less than 1 standard sample unit size of the same code, type, and size are combined to make 1 standard sample unit size. Ignore any excess units of product.

c. Each sample unit stands on its own.

d. Grade the sample as outlined in this manual under "How to evaluate a sample," pages 5-17, except: the number of units of product are adjusted to equal 1 standard sample unit size.

e. The acceptance number for the unofficial sample is the tolerance ("T") value for each applicable AQL. Ignore the "S," "L," and "Pa" values. The unofficial sample must also comply with the prerequisite quality factors for the assigned grade; and other defects, if any.

   Example 39: (The acceptance number is the "T" value)

TABLE IX

STANDARD SAMPLE UNIT SIZE = 100

AQL	S	T 1/	L	Pa=50%	Pa=10%
5.0	1	6	4	7.4	10.7

1/ If the tolerance ("T") is less than 1 (e.g.,) T=0.1, T=0.8), there are no defects allowed in that sample unit for that AQL.

APPENDIX.

7. Special procedure for unofficial samples (continuation).

   Example 40: (Tally of 4 unofficial samples)

Container Code				C49	E14	M02	R25

|		S	T	L				
P R E	Brightness				A	A	B	A
	Flavor and Odor				A	A	A	A
	Grit or Silt				A	A	A	A
C R I T I C A L	HEM					1		
	Total Critical				0	1	0	0
	CUSUM A	0.3	0.1	0.9				
	CUSUM B	0	1	1				
	CUSUM C	1	2	2				
S E V E R E	Fiber							
	Blemished				1	1		1
	Total Severe				1	1	0	1
	CUSUM A	0.5	1.5	2.0				
	CUSUM B	1	3	3				
	CUSUM C	1	5	3				
M A J O R	Blemished				1	1	1	1
	Devel. (Poorly)				1	1	1	1
	Total Major				2	2	2	2
	CUSUM A	1	3	3				
	CUSUM B	1	5	3				
	CUSUM C	1	8	4				
M I N O R / T O T A L	Blemished				1	1	2	5
	Devel. (Reason)				1	1	2	5
	Total Minor				2	2	4	10
	Total All Classes				5	6	6	15
	CUSUM A	1	8	4				
	CUSUM B	2	14	7				
	CUSUM C	3	22	9				
Sample Unit Grade					A	B	B	B
Final Grade								

APPENDIX.

8. Determining nonquality factors and prerequisite factors when multi-containers are drawn to equal "one sample unit."

It may be necessary to open more containers than the "number of sample units" to reach the required sample size (number of units of product). This situation could be encountered during inspection of small containers (e.g., 8-ounce, No.   300 or No. 303) or when assembling a "standard sample unit size" for unofficial samples. It is intended that only the "sample unit size" be inspected and recorded on the defect tally for nonquality factors and prerequisite factors, except, when it is obvious that some containers deviate excessively from the sample as a whole. You may do the following:

a. Predetermine at random the number of containers in the sample to inspect and record for nonquality and prerequisite factors that would be equal to the "sample unit size."

b. Make the determination and record the nonquality and prerequisite factors.

c. If upon examination of the other containers it's apparent that some containers deviate from the sample as a whole, you may reconsider the examination (e.g., one of the containers not in the predetermined number to check for nonquality factors is obviously "slack filled."

d. Follow Branch guidelines and other instructions which cover the deviation in question if you reconsider the examination.

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APPENDIX.

8. Determining nonquality factors and prerequisite factors when multi-containers are drawn to equal "one sample unit." (continuation)

Example 41: (8-ounce cans -- sample unit size = 6)
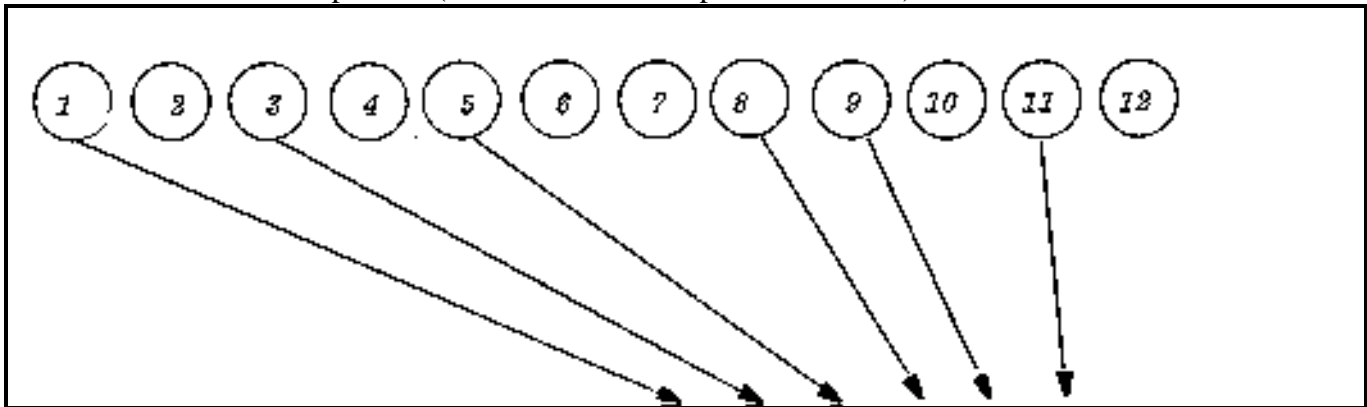
Container Code		AB	DE	GH	MN	RS	VW
Net Weight (Grams)		455	454	452	456	455	454
Vacuum		3	4	3	3	4	4
Drained Weight (grams)		297	283	289	269	297	286
Sirup (degrees Brix)		20	20	21	21	19	20
Designation		Heavy	---	---	---	---	---
Style		Halves	---	---	---	---	---
Count		15	12	14	15	14	16
P E R	Brightness		A	A	A	A	A	B
	Flavor and Odor		A	A	A	A	A	A
	Uniformity of Size		A	A	A	A	A	A
	Character		A	A	A	A	A	A
C R I T		S	T	L				
	HEM							
	Total Critical							

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APPENDIX.

8. Determining nonquality factors and prerequisite factors when multi-containers are drawn to equal "one sample unit." (continuation)

Example 42: (4 No. 2-1/2 Cans -- unofficial samples)
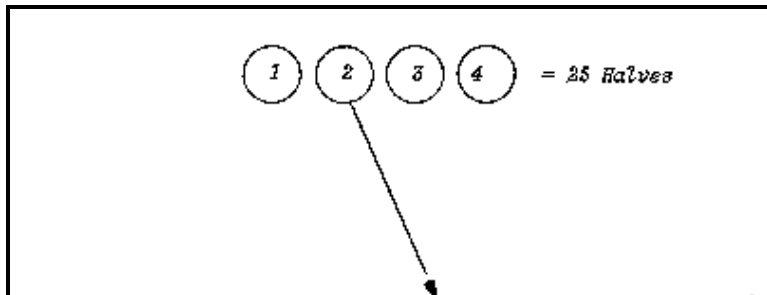
Container Code	M5					
Net Weight (Grams)	458					
Vacuum	10					
Drained Weight (grams)	298					
Sirup (degrees Brix)	20					
Designation	Heavy					
Style	Halves					
Count	7					

7 Halves

	Brightness	A						
P	Flavor and Odor	A						
E	Uniformity of Size	A						
R	Character	A						

		S	T	L						
C R	HEM				1					
I T	Total Critical				1					

25 Halves

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APPENDIX.

9.   Mixed quality inspection lots.

        Occasionally, an inspection lot may be encountered with individual sample
units in the sample which seem to be of lower quality than the sample as a   whole.
These "suspect" sample units may or may not be attributed to sample   variation. The
most obvious question to be answered is: Has lower quality   production been
intentionally or unintentionally mixed in to the inspection lot?   Even though a lot has
been intentionally mixed, we may not find a container of   lower quality product when
we draw the sample -- our acceptance sampling   rate is very lot. Thus, lower quality
product could get by undetected.

        If you do encounter an inspection lot which is obviously mixed quality, do the
        following:

        a.   Assemble the largest number of units of product possible from the   "sus-
                pect" containers, regardless of code. You must have at least 36 units of
                product. 1/

        b.   Perform a regular lot attributes inspection of the "suspect" product.

        c.   Compare the number of defects (or defectives) that you've found in the
                "suspect" sample to the acceptance number for each AQL and grade
                level in the standards.

        d.   Assemble the largest number of units of product possible from the
                remainder of the sample, regardless of code (the containers that aren't
                "suspect").

        e.   Compare the number of defects (or defectives) that you've found in the
                sample to the acceptance number for each AQL and grade level in the
                standards.

1/   This procedure may be impossible with small cans such as No. 300, No. 303 and No.
        2-1/2 -- less than 36 units. However, if the lot is accessible for sampling, a
        resampling could be made to get at least 36 units of the "suspect" product.

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APPENDIX.

9.   Mixed quality inspection lots (continuation).

     f.   Compare the results (the grade assigned) of the "suspect" units of product to the results (the grade assigned) of the "nonsuspect" sample. If the grade of the "suspect" sample is more than one grade below the grade of the "nonsuspect" sample, the sample may be certified to the lowest grade. If the applicant requests certification of the "nonsuspect" portion of the sample, resample the lot in accordance with Section 2852.2, page 6, "Lot" (a) of the "Regulations" (109-a-1).

These procedures for handling "suspect" containers must be used with discretion. Don't be overly critical. Allowance must be made for sample variability; thus, only containers much worse than the other containers in the sample should be considered for this procedure.

Example 43: (Mixed quality lot)
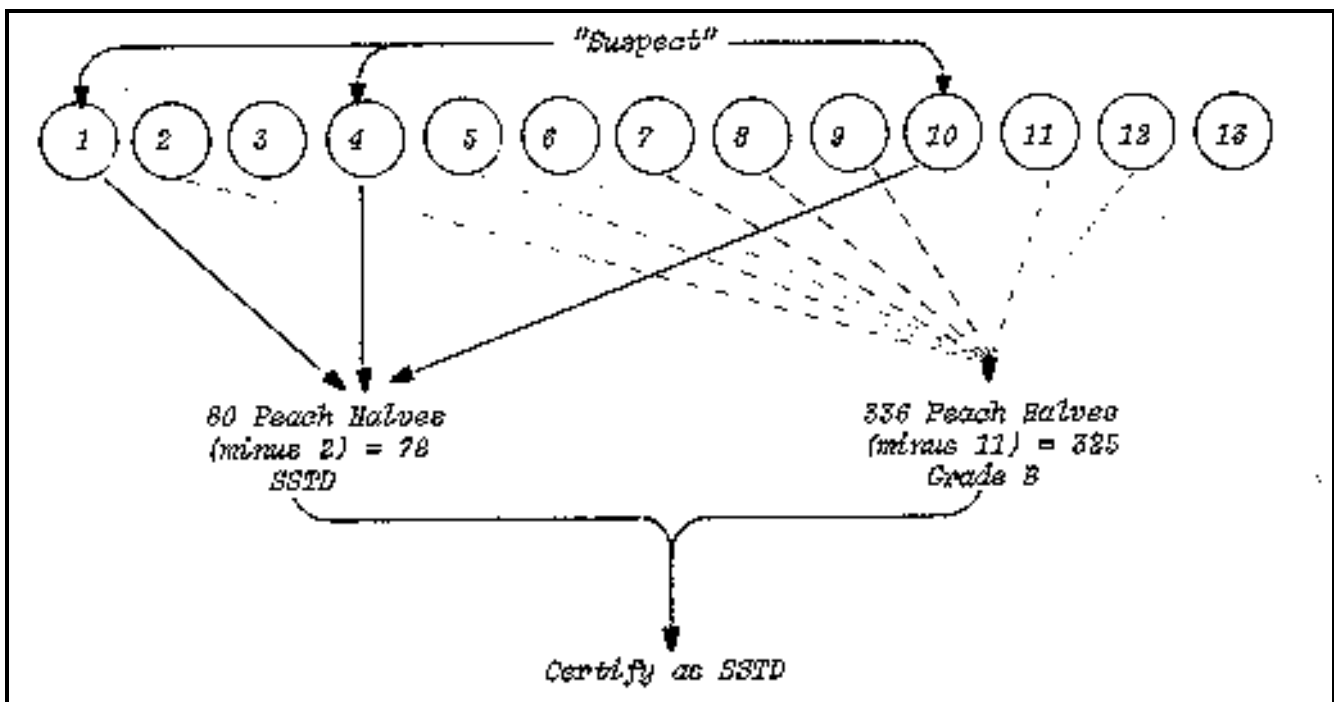
APPENDIX.

10. Probability of Acceptance (Pa).

The probability of acceptance (Pa) for the lot single sampling plan (attributes) aren't published in the "Regulations." Thus, they're given in this manual -- Tables I-V, pages 41-45. The Pa changes each time you change the number of   units of product that you examine. The larger the sample, the better the protection against acceptance of poorer quality, up to a point of diminishing return. Weigh protection against acceptance of poorer quality to decide if the sample size that you choose is adequate. The risks are largest with the plan for the standard sample unit size of 6. Also, 1.0 is the smallest AQL given under   the 6 plan.

Example 44: (Relationship of Pa to the OC Curve)

TABLE I
STANDARD SAMPLE UNIT SIZE = 6

AQL	6		13	
---	Pa=50%	Pa=10%	Pa=50%	Pa=10%
1.0	4.7	10.8	3.4	6.8
2.5	10.2	18.6	6.0	10.2
6.5	18.5	29.3	15.0	21.8

TABLE V
STANDARD SAMPLE UNIT SIZE = 100

AQL	6		13	
---	Pa=50%	Pa=10%	Pa=50%	Pa=10%
1.0	1.8	2.6	1.5	2.0
2.5	3.6	4.7	3.3	4.0
6.5	10.6	12.4	9.9	11.0

Defects per 100 units (or percent defective)

TABLE I

STANDARD SAMPLE UNIT SIZE = 6

NUMBER OF SAMPLE UNITS

AQL	6		13		21		29	
	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	P
Expressed as defects per hundred units or percent defective								
1.0	4.7	10.8	3.4	6.8	2.9	5.3	2.6	4
1.5	4.7	10.8	4.7	8.6	3.7	6.3	3.3	5
2.5	10.2	18.6	6.0	10.2	5.3	8.4	5.0	7
4.0	13.0	22.2	8.6	13.5	7.7	11.3	6.7	9
5.0	13.0	22.2	9.8	15.1	9.3	13.2	8.4	1
6.5	15.8	25.8	12.4	18.2	10.8	15.0	10.2	1
8.5	18.5	29.3	15.0	21.3	13.2	17.8	12.5	1
10.0	21.3	32.7	16.2	22.8	15.6	20.6	14.2	1
Expressed as defects per hundred units only								
12.5	24.1	36.1	20.1	27.3	18.0	23.3	17.1	2
15.0	26.9	39.5	22.7	30.3	21.2	26.9	20.5	2
20.0	35.2	49.4	29.1	37.6	26.7	33.1	25.7	3
25.0	40.7	55.9	35.5	44.8	33.1	40.1	31.4	3
33.0	51.9	68.8	44.4	54.8	41.8	49.6	40.6	4
40.0	60.2	78.3	52.1	63.3	49.7	58.2	48.1	5
50.0	71.3	90.9	63.7	76.0	60.8	70.2	58.9	6
65.0	88.0	109.5	80.3	94.1	77.5	88.0	75.6	8
85.0	113.0	137.2	103.4	118.9	98.8	110.2	96.8	1
100.0	129.6	155.5	118.8	146.2	114.7	126.9	112.9	1
150.0	185.2	215.8	173.7	192.9	168.7	183.5	165.8	1
250.0	293.1	329.6	280.1	304.4	273.4	292.3	269.8	2
Expressed as percent defective only								
12.5	23.9	33.6	20.0	26.2	17.9	22.6	17.0	2
15.0	26.6	36.6	22.6	28.9	20.3	25.1	19.9	2
20.0	32.1	42.4	27.7	34.4	26.7	31.9	25.1	2
25.0	37.6	48.1	34.0	41.1	31.4	36.8	30.8	3
33.0	45.9	56.4	41.7	48.9	40.1	45.7	38.8	4
40.0	54.1	64.4	49.4	56.6	47.2	52.9	46.3	5
50.0	65.1	74.7	59.6	66.5	57.5	63.1	56.6	6

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TABLE II

STANDARD SAMPLE UNIT SIZE = 13

NUMBER OF SAMPLE UNITS

AQL	6		13		21		29	
	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	F
Expressed as defects per hundred units or percent defective								
0.65	2.2	5.0	2.2	4.0	1.7	2.9	1.5	2
1.0	3.4	6.8	2.8	4.7	2.4	3.9	2.0	3
1.5	4.7	8.6	3.4	5.5	3.2	4.8	2.8	4
2.5	6.0	10.2	5.1	7.7	4.3	6.1	4.2	5
4.0	8.6	13.5	6.9	9.8	6.1	8.2	6.0	7
5.0	9.8	15.1	8.1	11.2	7.6	9.9	7.1	9
6.5	12.4	18.2	10.5	14.0	9.4	12.0	8.9	1
8.5	15.0	21.3	12.8	16.7	11.6	14.4	11.1	1
10.0	16.2	22.8	14.6	18.7	13.4	16.5	12.9	1
Expressed as defects per hundred units only								
12.5	20.1	27.3	17.6	22.0	16.4	19.7	15.6	1
15.0	22.7	30.3	20.5	25.3	18.9	22.5	18.5	2
20.0	29.1	37.6	25.8	31.2	24.8	28.8	24.0	2
25.0	35.5	44.8	31.8	37.6	30.3	34.7	29.3	3
33.0	44.4	54.8	40.6	47.2	39.0	43.9	38.1	4
40.0	52.1	63.3	48.3	55.5	46.3	51.6	45.5	4
50.0	63.7	76.0	59.0	66.9	57.3	63.2	56.1	6
65.0	80.3	94.1	75.4	84.0	73.1	79.7	72.0	7
85.0	103.4	118.9	96.7	106.4	94.3	101.9	93.0	9
100.0	118.8	146.2	112.7	123.2	110.1	118.2	108.6	1
Expressed as percent defective only								
12.5	20.0	26.2	16.9	20.8	16.0	18.9	15.5	1
15.0	22.6	28.9	19.9	24.0	18.9	22.1	18.2	2
20.0	27.7	34.4	25.2	29.6	24.0	27.4	23.5	2
25.0	34.0	41.1	30.5	35.2	29.5	33.1	28.8	3
33.0	41.7	48.9	39.4	44.2	37.9	41.7	37.0	4
40.0	49.4	56.6	46.5	51.4	45.2	49.1	44.2	4
50.0	59.6	66.5	56.5	61.3	55.1	59.0	54.2	5

TABLE III

NUMBER OF SAMPLE UNITS

AQL	6		13		21		29	
	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%
Expressed as defects per hundred units or percent defective								
0.4	1.8	3.5	1.1	2.1	1.1	1.8	0.9	1
0.65	2.4	4.5	1.7	2.9	1.5	2.2	1.2	1
1.0	3.1	5.3	2.1	3.2	1.8	2.7	1.7	2
1.5	3.8	6.2	3.0	4.4	2.6	3.6	2.3	3
2.5	5.1	7.8	4.2	5.8	3.7	4.9	3.5	4
4.0	7.1	10.3	6.1	8.0	5.7	7.1	5.3	6
5.0	8.4	11.9	7.3	9.4	6.8	8.4	6.4	7
6.5	10.4	14.2	9.1	11.4	8.5	10.2	8.1	9
8.5	13.1	17.3	11.3	13.8	10.8	12.7	10.3	1
10.0	14.4	18.8	13.1	15.9	12.3	14.4	12.0	1
Expressed as defects per hundred units only								
12.5	17.8	22.6	15.9	18.9	15.2	17.5	14.7	1
15.0	20.4	25.5	18.7	21.9	17.8	20.3	17.4	1
20.0	26.4	32.2	24.2	27.9	23.3	26.0	22.8	2
25.0	32.4	38.8	29.7	33.8	28.7	31.7	28.1	3
33.0	41.1	48.2	38.2	42.7	37.2	40.7	36.6	3
40.0	49.1	56.8	46.0	50.8	44.7	48.4	43.9	4
50.0	59.8	68.2	56.5	61.8	55.1	59.3	54.4	5
65.0	76.3	85.5	72.5	78.5	71.0	75.7	70.0	7
Expressed as percent defective only								
12.5	17.1	21.2	15.6	18.3	15.0	17.0	14.6	1
15.0	20.4	24.8	18.3	21.2	17.6	19.8	17.3	1
20.0	25.7	30.4	23.9	27.0	23.0	25.3	22.6	2
25.0	31.0	36.0	29.1	32.4	28.3	30.8	27.7	2
33.0	39.7	44.9	37.4	40.8	36.5	39.2	35.9	3
40.0	47.0	52.2	44.8	48.3	43.5	46.3	43.1	4
50.0	57.0	62.1	54.6	58.2	53.6	56.4	53.2	5

STANDARD SAMPLE UNIT SIZE = 50

NUMBER OF SAMPLE UNITS

AQL	6		13		21		29	
	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	
Expressed as defects per hundred units or percent defective								
0.15	0.6	1.3	0.6	1.0	0.4	0.8	0.4	
0.25	0.9	1.8	0.7	1.2	0.5	0.9	0.5	
0.4	1.2	2.2	0.9	1.4	0.8	1.2	0.7	
0.65	1.6	2.7	1.3	2.0	1.1	1.6	1.1	
1.0	2.2	3.5	1.8	2.6	1.6	2.1	1.5	
1.5	2.9	4.3	2.4	3.3	2.2	2.8	2.0	
2.5	4.2	5.9	3.6	4.7	3.4	4.2	3.2	
4.0	6.2	8.3	5.3	6.6	5.1	6.1	4.9	
5.0	7.2	9.4	6.6	7.9	6.2	7.2	6.0	
6.5	9.2	11.7	8.3	9.8	7.9	9.0	7.6	
8.5	11.6	14.3	10.4	12.1	10.0	11.3	9.8	
10.0	13.2	16.1	12.1	13.9	11.7	13.0	11.4	
Expressed as defects per hundred units only								
12.5	16.2	19.4	14.9	16.9	14.3	15.8	14.0	
15.0	18.9	22.3	17.6	19.7	17.0	18.6	16.7	
20.0	24.6	28.4	23.0	25.4	22.3	24.2	22.0	
25.0	29.9	34.1	28.2	30.9	27.6	29.6	27.2	
33.0	38.5	43.1	36.8	39.9	36.0	38.3	35.5	
40.0	46.2	51.2	44.2	47.6	43.3	45.9	42.8	
50.0	56.8	62.4	54.7	58.4	53.7	56.6	53.1	
Expressed as percent defective only								
12.5	15.9	18.7	14.7	16.7	14.2	15.6	14.0	
15.0	18.5	21.5	17.3	19.2	16.9	18.4	16.6	
20.0	23.9	27.1	22.7	24.8	22.0	23.7	21.8	
25.0	29.2	32.6	27.9	30.2	27.3	29.0	26.9	
33.0	37.5	41.1	36.1	38.5	35.5	37.4	35.1	
40.0	44.8	48.5	43.3	45.8	42.5	44.5	42.2	
50.0	54.8	58.5	53.3	55.8	52.6	54.6	52.2	

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TABLE V

STANDARD SAMPLE UNIT SIZE = 100

NUMBER OF SAMPLE UNITS

	6		13		21	
AQL	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%
Expressed as defects per 100 units or percent defective						
0.1	0.4	0.9	0.3	0.5	0.3	0.4
0.15	0.6	1.1	0.4	0.6	0.3	0.5
0.25	0.8	1.3	0.5	0.8	0.5	0.7
0.4	0.9	1.5	0.7	1.1	0.7	0.9
0.65	1.3	2.0	1.1	1.5	1.0	1.3
1.0	1.8	2.6	1.5	2.0	1.4	1.8
1.5	2.4	3.4	2.1	2.7	2.0	2.4
2.5	3.6	4.7	3.3	4.0	3.1	3.6
4.0	5.4	6.8	5.0	5.8	4.7	5.4
5.0	6.6	8.0	6.1	7.0	5.8	6.5
6.5	8.3	9.9	7.7	8.7	7.5	8.2
8.5	10.6	12.4	9.9	11.0	9.5	10.4
10.0	12.3	14.2	11.5	12.7	11.2	12.1
Expressed as defects per hundred units only						
12.5	14.9	17.1	14.1	15.5	13.8	14.8
15.0	17.6	19.8	16.8	18.3	16.4	17.5
20.0	23.1	25.6	22.1	23.8	21.6	22.9
25.0	28.4	31.2	27.3	29.2	26.8	28.3
33.0	36.9	40.1	35.7	37.8	35.1	36.7
40.0	44.4	47.9	43.0	45.3	42.3	44.1
50.0	54.9	58.8	53.3	55.9	52.5	54.6
Expressed as percent defective only						
12.5	14.8	16.7	14.0	15.3	13.7	14.7
15.0	17.4	19.4	16.7	18.0	16.3	17.3
20.0	22.8	24.9	21.9	23.4	21.5	22.6
25.0	27.9	30.3	27.0	28.6	26.6	27.8
33.0	36.3	38.8	35.2	36.9	34.7	36.0
40.0	43.4	46.0	42.3	44.0	41.8	43.2
50.0	53.4	56.0	52.3	54.1	51.8	53.2

APPENDIX.

10.   Probability of Acceptance (Pa) (continuation).

The probability of acceptance (Pa) values take on a new meaning if they are compared to the AQL's in the U.S. standards. However, all defects found in the sample must be equally offending against each grade level. Do not use the reasoning of example 45 if any of the defects are adjusted (see pages 31-32).

Example 45: (Relationship of Pa to specific AQL's)

	GRADE A				GRADE B				GRADE C		
	Total	Maj	Sev	Crit		Total	Maj	Sev	Crit	Total	Maj	Sev	Crit
AQL	78.5	4.0	1.5	1.0		20.0	6.5	4.0	1.5	35.0	10.0	6.5	2.5

TABLE II
STANDARD SAMPLE UNIT SIZE = 13

	6		13		21	
AQL	Pa=50%	Pa=10%	Pa=50%	Pa=10%	Pa=50%	Pa=10%
12.5	20.1	27.3	17.6	38.0	16.4	19.7

(50% chance of passing grade B)

(10% chance of passing grade A)

(Interpretation: Using 78 units of product, 13 x 6 = 78, there's a 50/50 chance of passing a grade B lot for grade A; and a 10% chance of passing a SSTD lot for grade A.)

Defects per 100 units (or percent defective)

CHANCE OF PASSING

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APPENDIX.

11. How to verify a sample (lot inspection).

It is possible to evaluate a small sample to indicate the reliability of the original evaluation of a large sample; or, to indicate if there has been a change in quality since the original evaluation; or, to audit another grader. The advantage of this procedure is to reduce the time required for regarding -- a small sample could be graded faster than a large sample. Then, if the small sample indicates the original evaluation is unreliable, other methods could be used to reevaluate the quality of the lot (such as regrading at the full sample size).

To verify a lot that has been previously graded under the lot single sampling plan (attributes), the procedure is as follows:

a. Obtain the smallest sample possible that would be suitable for the kind of product (e.g., draw a larger sample for green beans than for peach halves) and the anticipated grade level (e.g., draw a larger sample for a borderline lot than one that is well within grade).

b. Use the "Pa" values to assist in determining the sample size and reliability (e.g., an AQL of 5.0 has a Pa = 10% value of 22.2 for 36 units of product [6x6 = 36]; but the Pa = 10% value for 169 units of product [13 x 13 = 169] is 11.2 at the 5.0 AQL).

c. Grade the sample that you've selected.

d. Compare the results of the regrade to the results of the original grade.

e. Accept the original grade if it is verified by the regrade.

f. Resample at a larger sample size if you're not satisfied with the first regrade.

OPTIONAL LOT INSPECTION PROCEDURES USING
U.S. STANDARDS FOR GRADES - ATTRIBUTES

I.   OUTLINE.

STEP 1.   Determine sampling rate.

STEP 2.   Draw sample.

STEP 3.   Evaluate individual containers for:

-- NON QUALITY factors

-- SUBJECTIVE PREREQUISITE factors

STEP 4.   Determine the amount of product to be evaluated for:

-- OBJECTIVE PREREQUISITE factors

-- CLASSIFIED factors

STEP 5.   Evaluate the sample for:

-- OBJECTIVE PREREQUISITE factors

-- CLASSIFIED factors

STEP 6.   Obtain applicable AQL's from the U.S. Standard.

STEP 7.   Determine Acceptance Numbers from the Regulations (109-A-1) or attached Table I.

STEP 8.   Determine the grade for each classification.

STEP 9.   Determine the final grade for the lot.

II.   PROCEDURES - LOT INSPECTION BY ATTRIBUTES

STEP 1.   Determine the sampling rate from Sec. 2852.38c of Regulations Governing Inspection and Certification of Processed Fruits and Vegetables and Related Products (File Code 109-A-1).

STEP 2.   Draw the number of containers required to meet the prescribed sampling rate.

CAUTION: Be sure you have drawn enough containers to produce at least 36 units of product. Units may be by count or by weight. See applicable style in the U.S. Standard for the product that is being inspected.

STEP 3.   Begin the inspection by performing the examination of nonquality (net weight vacuum, etc.) factors and subjective prerequisites (usually similar varietal characteristics, flavor and odor, and brightness or appearance) on a number of containers at least equal to the sampling rate.

STEP 4.   Determine the amount of product to be used. Add all of the units of product together (units of count or weight). Simply count all of the units (halves, slices, etc.) where count is the criteria but units of weight must be calculated as follows:

$$\frac{(W_d)\ (28.3495)}{U_g} = units_t$$

Where:

W_d = Total of all the drained weights of the sample in ounces.

U_g = Weight of an individual unit expressed in grams.

28.3495 = Number of grams in one ounce.

$Units_t$ = Total number of Units in sample

The following example is for six No. 10 cans of Diced Peaches which have the following drained weights:

```
73.5  oz.
71.9
74.7
72.8
73.9
74.2
441.0  oz.      441.0 x 28.3495
                  8   = 1562.77 units
```
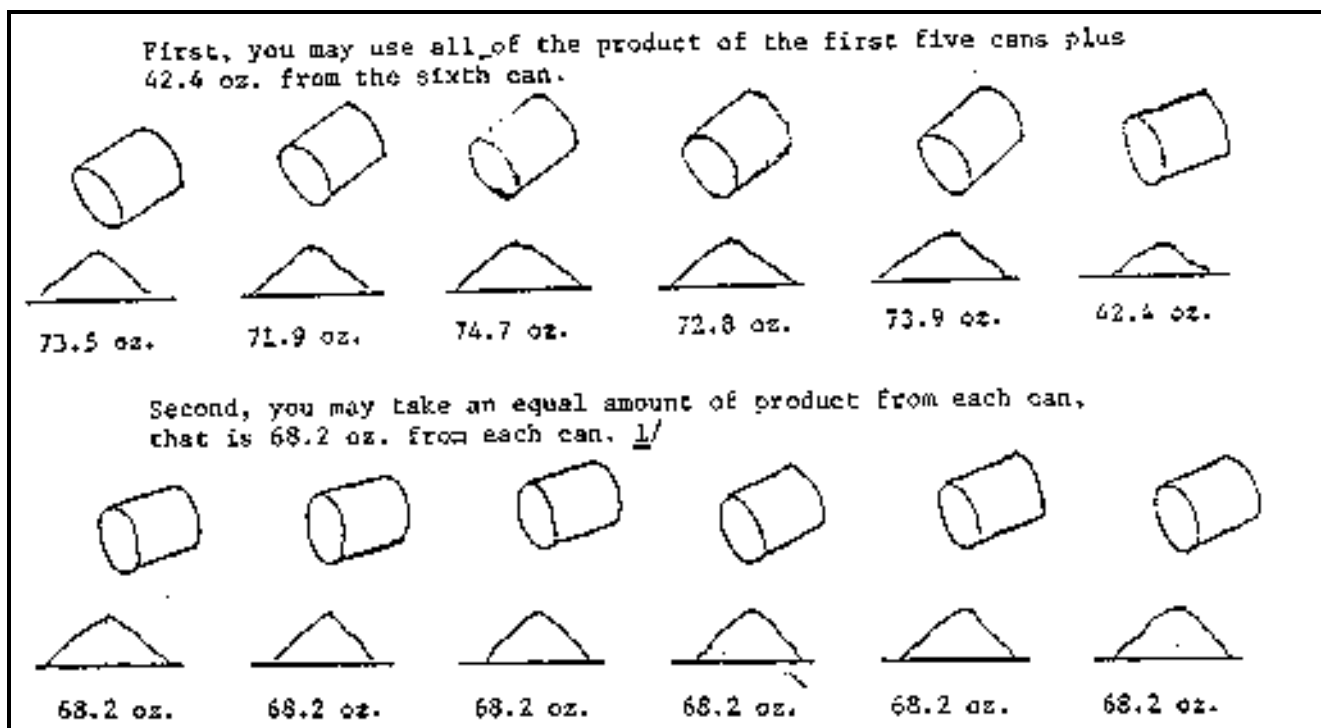
1

STEP 4.   (continued)

From the below table (File Code 120-A-7, Appendix, Section 1 - adjusted to 8 g increments), the largest number of units less than 1562.77 units is 1450). This is the amount of product to be used for inspection. It would be 1450 units = 11,600 g = 409.2 oz.   You may derive this 409.2 oz. of product two different acceptable ways.

NUMBER OF SAMPLE UNITS

		6	13	21	29
STANDARD	6	36 x 8 g = (288 g or 10.2 oz)	78 x 8 g = (624 g or 22 oz)	126 x 8 g = (1008 g or 35.6 oz)	174 x 8 g = (1392 g or 49.1 oz)
SAMPLE	13	78 x 8 g = (624 g or 22 oz)	169 x 8 g = (1352 g or 47.7 oz)	273 x 8 g = (2184 g or 77 oz)	377 x 8 g = (3016 g or 98.7 oz)
UNIT	25	150 x 8 g = (1200 g or 42.3 oz)	325 x 8 g = (2600 g or 91.7 oz)	525 x 8 g = (4200 g or 148.2 oz)	725 x 8 g = (5800 g or 204.6 oz)
SIZES	50	300 x 8 g = (2400 g or 84.7 oz)	650 x 8 g = (5200 g or 183.4 oz)	1050 x 8 g = (8400 g or 295.3 oz)	1450 x 8 g = (11600 g or 409.2 oz)
Total Weight of Dice 1/	100	600 x 8 g = (4800 g or 169.3 oz)	1300 x 8 g = (10400 g or 366.8 oz)	2100 x 8 g = (16800 g or 818.4 oz)	

1/   Sample size x 8 g increments = weight of diced peaches equivalent to the number of sample units = the standard sample unit size.

First, you may use all of the product of the first five cans plus
42.4 oz. from the sixth can.

73.5 oz.   71.9 oz.   74.7 oz.   72.8 oz.   73.9 oz.   42.4 oz.

Second, you may take an equal amount of product from each can,
that is 68.2 oz. from each can. 1/

68.2 oz.   68.2 oz.   68.2 oz.   68.2 oz.   68.2 oz.   68.2 oz.

1/ This method requires evaluating the balance of each can for foreign material.

STEP 5. Evaluate the product as to the objective prerequisites (pit frags, loose seeds, decay, character, etc.) and the classified defects and record in the applicable section of the tally sheet.

There are several correct ways to handle the summation of the defects. The following options may be used:

a.   Mass of the product together, remove the defects and record on the tally sheet; or

b.   Inspect the product from each individual container, mass the defects of each classification together and record on the tally sheet; or

c.   Inspect the product from each individual container, record the defects on the tally sheet and then total the defects of each classification.

STEP 6. Next, refer to the Acceptable Quality Level (AQL) Tables in the U.S. Standards applicable style of the product being evaluated. The AQL's will appear similar to the following example:

	GRADE A				GRADE B				GRADE C			
	Total 2	Maj	Sev	Crit	Total 2	Maj	Sev	Crit	Total 2	Maj	Sev	Crit
AQL 1												
	5.0	1.5	0.65	0.15	10.0	4.0	1.5	0.40	15.0	6.5	2.5	0.65

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STEP 7.　　　　Acceptance numbers are found in applicable tables, Section 2852.38C of the Regulations Governing Inspection and Certification of Processed Fruits and Vegetables and Related Products (File Code 109-A-1). The applicable lot inspection tables are XV; XVI; XVIII or XIX of the regulations or use attached Table I.

　　　　To determine the correct table, select the one that has a "Standard Sample Unit Size" that corresponds to the "Standard Sample Unit Size Row" selected in STEP 4.

　　　　To determine the "Column" of Acceptance Numbers to use, pick the one that has the number of sample units that corresponds to the number of sample units "Column" selected in STEP 4.

Example:　　　　The example used in STEP 4 selected 1450 units of product to be evaluated; thus, the 1450 unit box was found in the "50" standard sample unit size "Row" and in the "29" number of sample units "Column"; therefore, select Table XVIII (which is the one for "Standard sample unit size = 50") and select from the 29 number of sample units "Column", the acceptance numbers that correspond to the applicable AQL's found in the far left column.

STEP 8.　　　　Compare the number of defects found in each classification with the acceptance number

applicable for that classification. Determine the grade of each classification.

STEP 9.　　　　Determine the grade of the lot from the lowest grade given to any prerequisite or classification of defects.

SPECIAL SITUATIONS

A.   If the sample rate and the number of units per container are such that the minimum number of units of product required to evaluate a lot is not met, then extra containers must be drawn to meet this requirement.

EXAMPLE:

A lot of 200 cases of 24/8 oz. peach halves is to be sampled. Using Table XI of File Code 109-A-1 (Regulations) Section 2852.38c, the lot sample size would be 6, but 6 cans would not yield 36 halves (probably 18-24 halves). Therefore, draw 2 containers from each location sampled in the lot. Mark each container with the same identifications.
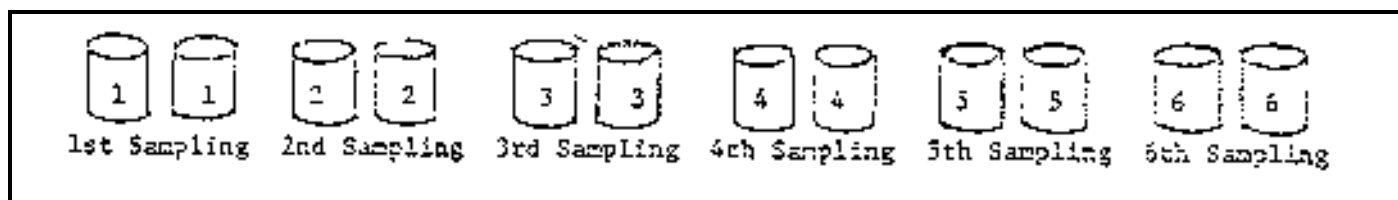
Evaluate the non-quality factors and subjective prerequisites on one container from each sampling and then use enough of the extra containers to make up the needed 36 units to complete the evaluation.

B.   If the lot consists of large institutional size containers (i.e. No. 10 metal cans,   2-3 pound cartons, gallons, etc.), then, 3 sample units may be drawn if   Inspection Aid No. 42 specifies the 3 sample unit rate. The number of product units from the 3 containers must still be equal to or greater than 36.

C.   If the lot consists of containers of obvious non-uniformity, the judgment of quality must be exercised before proceeding with evaluation. If it is obvious that the applicant is attempting to "dilute" defects by mixing poor quality with good quality, follow the instructions on pages 38 and 39 of File Code 120-A-7. If all of the containers in the sample have the same code, then the final lot grade should be that of the obviously low quality.

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AQL	36	78	126	150	169	174	273	300	325	377	525	600	650	725	1050	1300	1450	2100	2900
ACCEPTANCE NUMBERS **QUALITY LEVELS EXPRESSED AS DEFECTS PER HUNDRED UNITS OR PERCENT DEFECTIVE**																			
0.10	0	0	0	0	0	0	1	1	1	1	1	2	2	2	3	3	4	5	6
0.15	0	0	0	0	1	1	1	1	1	2	2	3	3	3	4	4	5	6	8
0.25	0	0	1	1	1	1	2	2	2	3	3	4	4	4	5	6	7	9	12
0.40	0	1	1	2	2	2	3	3	3	4	5	5	5	6	8	9	10	13	17
0.65	0	1	2	3	3	3	4	4	5	5	7	7	8	8	11	13	15	20	26
1.0	1	2	3	4	4	4	6	6	6	7	9	10	11	12	16	19	21	29	38
1.5	1	3	4	5	5	5	8	8	9	10	13	14	15	16	22	27	29	41	54
2.5	3	4	6	7	8	8	11	12	13	15	19	21	23	25	35	42	46	64	86
4.0	4	6	9	10	11	11	16	18	19	22	29	32	34	38	53	64	70	99	134
5.0	4	7	11	12	13	14	20	21	23	26	35	39	42	46	64	78	86	122	165
6.5	5	9	13	15	17	17	25	27	29	33	44	49	53	58	82	99	110	156	211
8.5	6	11	16	19	21	21	31	34	36	41	56	63	67	74	105	128	142	200	272
10.0	7	12	19	21	24	24	36	39	42	48	64	73	78	86	122	149	165	234	318
QUALITY LEVELS EXPRESSED AS DEFECTS PER HUNDRED UNITS ONLY																			
12.5	8	15	22	26	29	29	44	48	51	58	79	89	96	106	150	183	203	289	394
15.0	9	17	26	30	34	35	51	56	60	69	93	105	114	126	178	218	242	344	469
20.0	12	22	33	39	43	44	67	73	78	90	122	138	149	165	234	287	318	454	620
25.0	14	27	41	48	53	54	82	89	96	110	150	170	183	203	289	355	394	563	769
33.0	18	34	52	61	68	70	106	115	124	143	195	221	239	265	377	463	514	736	1008
40.0	21	40	62	73	81	83	126	138	149	171	234	266	287	318	454	558	620	888	1216
50.0	25	49	76	89	99	102	156	170	183	211	289	329	355	394	563	692	769	1103	1513
65.0	31	62	97	114	127	131	199	218	235	271	372	423	456	507	-	-	-	-	-
85.0	40	80	124	146	163	168	257	281	304	350	-	-	-	-	-	-	-	-	-
100.0	46	92	144	170	190	196	300	329	355	409	-	-	-	-	-	-	-	-	-
150.0	66	135	212	250	280	288	-	-	-	-	-	-	-	-	-	-	-	-	-
250.0	105	218	344	407	456	469	-	-	-	-	-	-	-	-	-	-	-	-	-
QUALITY LEVELS EXPRESSED AS PERCENT DEFECTIVE ONLY																			
12.5	8	15	22	25	28	29	43	47	50	58	78	88	95	105	149	182	202	287	392
15.0	9	17	25	30	33	34	51	55	59	68	92	104	112	125	177	216	240	342	467
20.0	11	21	33	38	42	43	65	71	77	88	120	136	147	163	231	284	315	450	615
25.0	13	26	39	46	51	53	80	87	94	108	148	167	181	200	286	351	390	558	763
11.0	16	32	50	59	66	67	103	112	121	139	191	217	234	260	372	457	508	728	999
40.0	19	38	59	70	78	80	123	134	145	166	228	260	281	312	446	549	611	877	1203
50.0	23	46	72	85	95	98	150	164	177	204	281	320	346	385	552	680	756	1088	1434
65.0	28	57	90	107	120	123	190	209	225	260	359	409	443	492	708	873	972	1401	1927
85.0	34	71	114	135	151	156	242	265	287	332	400	524	567	632	912	1126	1255	1812	2497

August 24, 1979

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NUMBER OF UNITS	36	78	126	150	169	174	273	300	325	377	525	600	650	725	1050	1300	1450	2100	2900

ACCEPTANCE NUMBERS
QUALITY LEVELS EXPRESSED AS DEFECTS PER HUNDRED UNITS OR PERCENT DEFECTIVE

AQL	36	78	126	150	169	174	273	300	325	377	525	600	650	725	1050	1300	1450	2100	2900
0.04	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	3
0.065	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	3	3	4
0.10	0	0	0	0	0	0	1	1	1	1	1	2	2	2	3	3	4	5	6
0.15	0	0	0	0	1	1	1	1	1	2	2	3	3	3	4	4	5	6	8
0.25	0	0	1	1	1	1	2	2	2	3	3	4	4	4	5	6	7	9	12
0.40	0	1	1	2	2	2	3	3	3	4	5	5	5	6	8	9	10	13	17
0.65	0	1	2	3	3	3	4	4	5	5	7	7	8	8	11	13	15	20	26
1.0	1	2	3	4	4	4	6	6	6	7	9	10	11	12	16	19	21	29	38
1.5	1	3	4	5	5	5	8	8	9	10	13	14	15	16	22	27	29	41	54
2.5	3	4	6	7	8	8	11	12	13	15	19	21	23	25	35	42	46	64	86
4.0	4	6	9	10	11	11	16	18	19	22	29	32	34	38	53	64	70	99	134
5.0	4	7	11	12	13	14	20	21	23	26	35	39	42	46	64	78	86	122	165
6.5	5	9	13	15	17	17	25	27	29	33	44	49	53	58	82	99	110	154	211
8.5	6	11	16	19	21	21	31	34	36	41	56	63	67	74	105	128	142	200	272
10.0	7	12	19	21	24	24	36	39	42	48	64	73	78	86	122	149	165	234	318

QUALITY LEVELS EXPRESSED AS DEFECTS PER HUNDRED UNITS ONLY

AQL	36	78	126	150	169	174	273	300	325	377	525	600	650	725	1050	1300	1450	2100	2900
12.5	8	15	22	26	29	29	44	48	51	58	79	89	96	106	150	183	203	289	394
15.0	9	17	26	30	34	35	51	56	60	69	93	105	114	126	178	218	242	344	496
20.0	12	22	33	39	43	44	67	73	78	90	122	138	149	165	234	287	318	454	620
25.0	14	27	41	48	53	54	82	89	96	110	150	170	183	203	289	355	394	563	769
33.0	18	34	52	61	68	70	106	115	124	143	195	221	239	265	377	463	514	736	1008
40.0	21	40	62	73	81	83	126	138	149	171	234	266	287	318	454	558	620	888	1216
50.0	25	49	76	89	99	102	156	170	183	211	289	329	355	394	563	692	769	1103	1513
65.0	31	62	97	114	127	131	199	218	235	271	372	423	456	507	725	892	993	1425	1956
70.0	33	67	103	122	136	140	214	234	252	291	399	454	490	545	780	960	1067	1533	2104
75.0	36	71	110	130	145	149	228	250	269	310	426	485	524	582	834	1026	1142	1640	2252
85.0	40	80	124	146	163	168	257	281	304	350	481	546	591	657	941	1139	1289	1854	2545
100.0	46	92	144	170	190	196	300	329	355	409	562	640	692	796	1103	1359	1512	2173	2988
150.0	66	135	212	250	280	288	-	-	-	-	-	-	-	-	-	-	-	-	-
250.0	105	218	344	407	456	469	-	-	-	-	-	-	-	-	-	-	-	-	-

QUALITY LEVELS EXPRESSED AS PERCENT DEFECTIVE ONLY

AQL	36	78	126	150	169	174	273	300	325	377	525	600	650	725	1050	1300	1450	2100	2900
12.5	8	15	22	25	28	29	43	47	50	58	78	88	95	105	149	182	202	287	392
15.0	9	17	25	30	33	34	51	55	59	68	92	104	112	125	177	216	240	342	467
20.0	11	21	33	38	42	43	65	71	77	88	120	136	147	163	231	284	315	450	615
25.0	13	26	39	46	51	53	80	87	94	108	148	167	181	200	286	351	390	558	763
33.0	16	32	50	59	66	67	103	112	121	139	191	217	234	260	372	457	508	728	999
40.0	19	38	59	70	78	80	123	134	145	166	228	260	281	312	446	549	611	877	1203
50.0	23	46	72	85	95	98	150	164	177	204	281	320	346	385	552	680	756	1088	1494
65.0	28	57	70	107	120	123	190	209	225	260	359	409	443	492	708	873	972	1401	1927
70.0	29	61	96	114	128	132	204	223	241	279	385	438	474	528	739	937	1044	1505	2071
75.0	31	64	102	121	136	140	217	237	257	297	410	467	506	563	811	1001	1115	1608	2213
85.0	34	71	114	135	151	156	242	265	287	332	400	524	567	632	1912	1126	1255	1812	2497